A novel fluorescent Schiff base grafted on dialdehyde nanocellulose for the selective detection of Fe2+and Fe3+ in environmental and biochemical applications

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In the biological system the metal and the transition metal have a fundamental role, explain and supporting different proteins and enzymes. Variation in their amounts and in their oxidation states can remarkably modify the steady states of living organism and of consequences biological functions. Starting from these points of view we have try to synthetize a new biological sensor based on fluorescent Schiff base grafted on dialdehyde nanocellulose (Py-PDA-DANC) fluorescent chemo-sensor giving rise to the new blue-fluorescent complex. All the synthesized products were characterized using by different spectroscopic techniques (such us FTIR, XRD, EDX and UV-VIS spectroscopy) analyzed for their biocompatibility and their ability to interact with various metal ions (Co^{2+}, Cr^{3+}, Cu^{2+}, Fe^{2+}, Fe^{3+}, Hg^{2+}, K^{+}, Mg^{2+}, Mn^{2+}, Na^{+}, Ni^{2+}, Pb^{2+} and Zn^{2+}). The fluorescent sensor showed high and selective quenching response to both Fe^{2+} and Fe^{3+} ions with low limit of detection (LOD), resulting promising for the determination of these pollutant heavy metal ions in biological environments. Py-PDA-DANC was also successfully applied for sensing of heme-iron coordinated to hemoglobin and methemoglobin, displaying a LOD of 28.45 nM and 55.18 nM, respectively. Subsequently, it was applied for the analysis of hemoglobin and methemoglobin and the corresponding amounts of Fe^{2+} and Fe^{3+} amount in biological samples with recoveries and sensibility comparable or superior to the one present in the commerce.

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